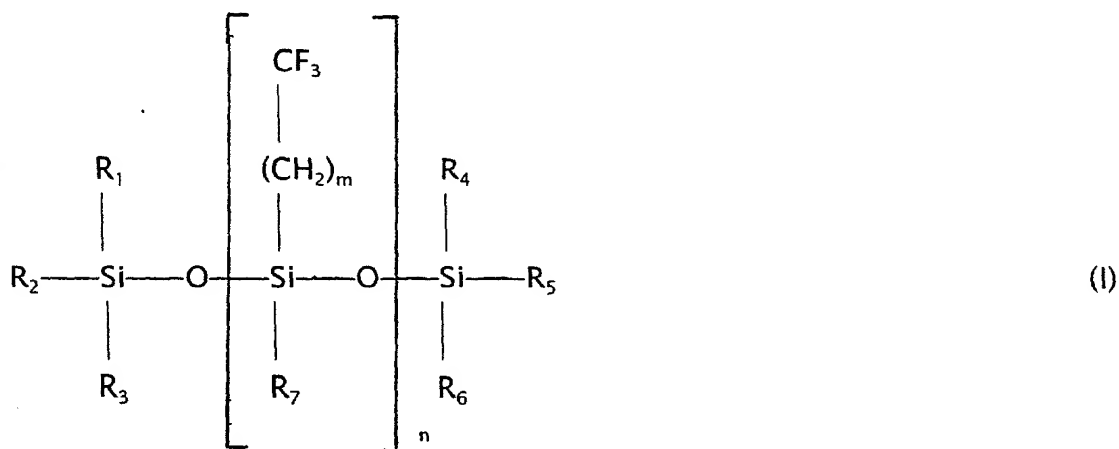


# THERMOSET POLYMERS WITH POLYFLUORO- ALKYLSILOXANE MODIFIED SURFACES

## WE CLAIM:

1. A mixture comprising (1) a cross-linkable thermosetting resin providing composition and intimately admixed therewith, (2) from about 0.01 to about 5%, by weight, based on the weight of the mixture of an additive comprising a polyfluoroalkylsiloxane, said additive having a lower surface energy than that of the thermoset resin formed by cross-linking said composition; said additive being a polyfluoroalkylsiloxane having the formula:



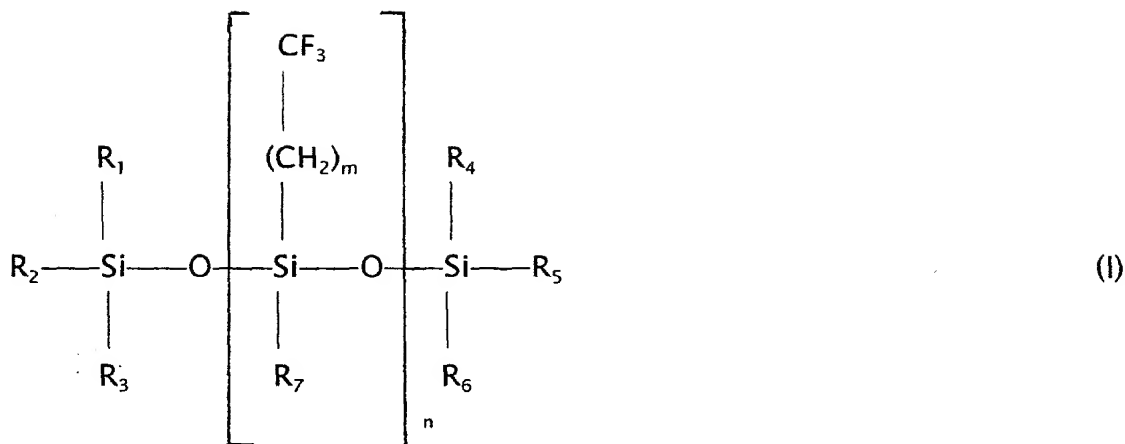
wherein  $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$  and  $R_7$  may be the same or different and may be alkyl, cycloalkyl or aryl;  $R_7$  may also be  $-(CH_2)_m-CF_3$ ;  $m$  is an integer from 0 to 20, and  $n$  is an integer from 1 to 5,000; or

said additive being a silanol terminated derivative of said polyfluoroalkylsiloxane or a copolymer of said polyfluoroalkylsiloxane with an alkyl, aryl or alkyl-aryl-siloxane.

2. A mixture according to claim 1 wherein said additive is a polytrifluoropropylmethylsiloxane or a copolymer of said polytrifluoropropylmethylsiloxane.

3. A mixture according to claim 1 wherein each of said alkyl groups may be methyl, ethyl, propyl, butyl, octyl or dodecyl.

4. A method of forming a composition of matter comprising a cross-linked thermoset resin and from about 0.01 to about 5%, by weight of an additive comprising a polyfluoroalkylsiloxane, said additive having a lower surface energy than that of said resin; said method comprising intimately admixing with a cross-linkable thermosetting resin providing composition (I) a polyfluoroalkylsiloxane having the formula:



wherein  $\text{R}_1$ ,  $\text{R}_2$ ,  $\text{R}_3$ ,  $\text{R}_4$ ,  $\text{R}_5$ ,  $\text{R}_6$  and  $\text{R}_7$  may be the same or different and may be alkyl, cycloalkyl or aryl;  $\text{R}_7$  may also be  $-(\text{CH}_2)_m-\text{CF}_3$ ;  $m$  is an integer from 0 to 20, and  $n$  is an integer from 1 to 5,000; or

a silanol terminated derivative of said polyfluoroalkylsiloxane or a copolymer of said polyfluoroalkylsiloxane or a copolymer of said polyfluoroalkylsiloxane with an alkyl, aryl or alkyl-aryl-siloxane;

followed by subjecting said mixture to conditions which produce a cross-linked thermoset solid resin wherein the concentration of said additive through a cross-section of said solid composition is lower in the interior thereof and higher at the surfaces thereof.

5. A method according to claim 4 including a preliminary step of forming a pre-mix comprising a fractional portion of said cross-linkable thermosetting resin composition (I) in particulate form substantially uniformly wetted with said polyfluoroalkylsiloxane and mixing said wetted first

fraction with the remainder of said cross-linkable thermosetting resin composition (I).

6. A method according to claim 4 wherein each of said alkyl groups may be methyl, ethyl, propyl, butyl, octyl or dodecyl.

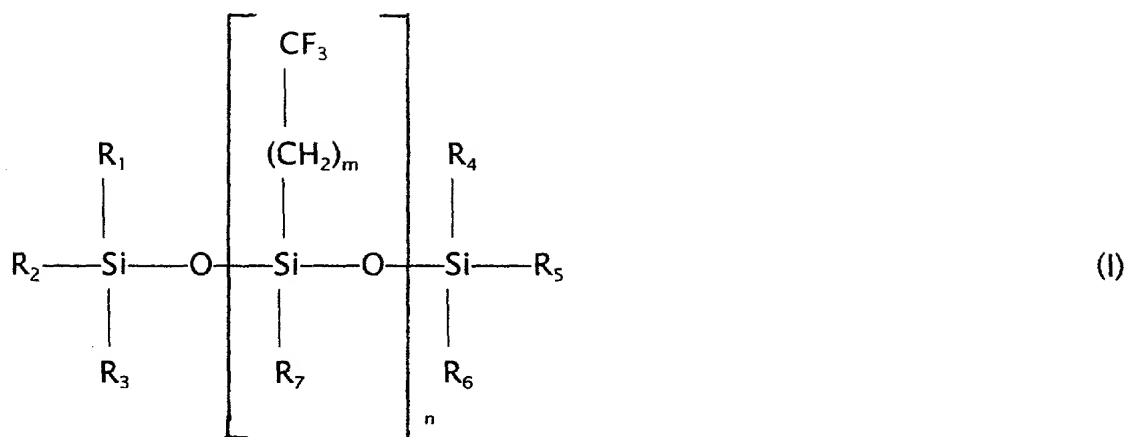
7. A method according to claim 4 wherein said polyfluoroalkylsiloxane is a polytrifluoropropylmethylsiloxane or a copolymer of said polytrifluoropropylmethylsiloxane.

8. The composition of matter produced by the method of claim 4.

9. A composition according to claim 8 wherein each of said alkyl groups may be methyl, ethyl, propyl, butyl, octyl or dodecyl.

10. A composition according to claim 8 wherein said polyfluoroalkylsiloxane is a polytrifluoropropylmethylsiloxane or a copolymer of said polytrifluoropropylmethylsiloxane.

11. A composition of matter comprising (1) a cross-linked thermoset resin and (2) from about 0.01 to about 5%, by weight, based on total weight of the composition of a polyfluoroalkylsiloxane having the formula:



wherein  $\text{R}_1$ ,  $\text{R}_2$ ,  $\text{R}_3$ ,  $\text{R}_4$ ,  $\text{R}_5$ ,  $\text{R}_6$  and  $\text{R}_7$  may be the same or different and may be alkyl, cycloalkyl or aryl;  $\text{R}_7$  may also be  $-(\text{CH}_2)_m-\text{CF}_3$ ;  $m$  is an integer from 0 to 20, and  $n$  is an integer from 1 to 5,000; or

a silanol terminated derivative of said polyfluoroalkylsiloxane or a copolymer of said polyfluoroalkylsiloxane or a copolymer of said polyfluoroalkylsiloxane with an alkyl, aryl or alkyl-aryl-siloxane;

wherein the concentration of said polyfluoroalkylsiloxane through a cross-section of said composition is lower in the interior thereof and higher at the surfaces thereof.

12. A composition according to claim 11 wherein each of said alkyl groups may be methyl, ethyl, propyl, butyl, octyl or dodecyl.

13. A composition according to claim 11 wherein said polyfluoro-alkylsiloxane is a polytrifluoropropylmethylsiloxane or a copolymer of said polytrifluoropropylmethylsiloxane.

13. A composition according to claim 11 wherein said polyfluoro-alkylsiloxane is a polytrifluoropropylmethylsiloxane or a copolymer of said polytrifluoropropylmethylsiloxane.